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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,814	02/23/2004	Tatsuo Fukui	118801	5464

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EXAMINER	
AKANBI, ISIAKA O	
ART UNIT	**PAPER NUMBER**
2877	

DATE MAILED: 06/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/782,814	FUKUI ET AL.	
	Examiner	Art Unit	
	Isiaka O. Akanbi	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 May 2006*.

2a)☒ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) *2* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12 and 14-19* is/are rejected.

7)☒ Claim(s) *13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *13 July 2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Amendment

The amendment file 08 May 2006 has been entered into this application. Claim 2 is cancelled and claims 14-19 are added.

Information Disclosure Statement

The information disclosure statement file 13 July 2004 has been entered and reference considered by the examiner.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3-6, 7-11 and 13-19, are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugaya et al. (5,680,200) in view of Fukai (JP 2000349014 A).

Claims 1, 3-6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over of Sugaya in view of Fukai. The reference of Sugaya teaches of the features of claims 1, 3-6 and 10, comprising an illumination optical system for illuminating a measurement mark (WM) with illumination light (103), an imaging optical system (19) for converging light reflected from said measurement mark to form an image of said measurement mark on an image pickup apparatus, said mark position detection apparatus measuring a positional displacement of said measurement mark by processing an image signal obtained by said image pickup apparatus (col. 2, line 31-52), the reference of Sugaya suggested the use of plane parallel plate for compensating /adjusting system for moving a luminous flux in parallel (103)(col. 28, line 25-29) (fig. 19)(col. 27, line 34-col. 29, line 41), however the reference of Sugaya is silent regarding the plane parallel plate functioning as an optical element that is provided in a parallel light flux portion of said illumination optical system and compensates a difference in asymmetry of said image signal generated by positional displacement of an image of an illumination aperture stop

caused by a shorter wavelength range and a longer wavelength range of said illumination light. The reference of Fukui teaches that it would have been known to use a parallel plate (see fig. 8, paragraph 12) functioning as claimed. It would have been obvious to one having ordinary skill in the art at the time of invention to combine the invention of Suguya with the use of a parallel plate as the reference suggest in order to provide the function as taught by Fukai in order to provide accurate alignment.

Claims 4-5 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over of Sugaya in view of Fukai, as applied to claim 1 above. The reference of Sugaya teaches of the features of claim 1, comprising optical element (fig. 19) and suggested the use of an optical elements (i.e. plane parallel plate first optical element or said second optical element)(col. 28, line 25-29 and col. 28, line 33-36), however the reference of Sugaya is silent regarding the plane parallel plate as being provided with a tilting mechanism. The reference of Fukui teaches that it would have been known to use a parallel plate and a tilting mechanism (see figs. 1 and 8, paragraph 12) functioning as claimed. It would have been obvious to one having ordinary skill in the art at the time of invention to combine the invention of Suguya with the use of a parallel plate as the reference suggest and provide a tilting mechanism for the parallel plate as taught by Fukai for the purpose of adjusting/compensating system for moving a luminous flux in parallel with accuracy.

Regarding claim 10, Sugaya discloses a method for adjusting a microscope apparatus having an illumination optical system for illuminating a measurement mark (WM) with illumination light (103) and an imaging optical system (19) for converging light reflected from said measurement mark to form an image of said measurement mark on an image pickup apparatus, said microscope apparatus detecting a positional displacement of said measurement mark by processing an image signal obtained by said image pickup apparatus (fig. 19), suggested the use of an optical elements (i.e. plane parallel plate first optical element or said second optical element)(col. 28, line 25-29 and col. 28, line 33-36), however the reference of Sugaya is silent regarding an optical element that is use for shifting a light axis of said illumination light and adjusting said optical element to minimize a difference in light intensity values based on said image signal generated by positional displacement of an image of the illumination aperture stop caused by a shorter wavelength range and a longer wavelength range of said illumination light. The reference of Fukui teaches that it would have been known to use a

parallel plate (see fig. 8, paragraph 12) functioning as claimed. It would have been obvious to one having ordinary skill in the art at the time of invention to combine the invention of Suguya with the use of an optical element (i.e. plane parallel plate first optical element or said second optical element) as the reference suggested and provide a tilting mechanism for the parallel plate as taught by Fukai for the purpose of adjusting/compensating system for moving a luminous flux in parallel with accuracy.

As regard to claim 11, Sugaya discloses everything claimed, as applied to claim 10 above, in addition Sugaya discloses wherein said measurement mark comprising linear indents having a regular width that are arranged periodically with regular intervals (fig. 7)(fig. 54).

Claims 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugaya et al. (5,680,200) in view of Bae (5,766,809)

Claims 12 rejected under 35 U.S.C. 103(a) as being unpatentable over of Sugaya in view of Bae, as applied to claim 10. The reference of Sugaya teaches of the features of claim 12, comprising measurement mark (WM), however the reference of Sugaya is silent regarding the said measurement mark comprising at least two small rectangular indents having the common center, and the depths of said two rectangular indents are different from each other. The reference of Bae teaches of two small rectangular indents having the common center, and the depths of said two rectangular indents are different from each other (fig. 8). It would have been obvious to one having ordinary skill in the art at the time of invention to use two small rectangular indents having the common center, and the depths of said two rectangular indents are different from each other for the purpose of testing an overlay occurring in a semiconductor device to compensate for an error generated in the measurement of overlay.

Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over of Sugaya in view of Fukai, as applied to claims 1 and 3 above. The reference of Sugaya teaches of the features of claim 1 and 3, comprising inspection apparatus (fig. 19) and further suggested the use of additional optical element (i.e. plane parallel plate first optical element or said second optical element)(col. 28, line 25-29 and col. 28, line 33-36), however the reference of Sugaya is silent regarding said optical element is adjusted such that a first measurement error tool induced shift (TIS) is measured upon limiting a shorter wavelength range in said illumination light, a

second measurement error TIS is measured upon limiting a longer wavelength range, and said optical element is adjusted to make a difference in the first and the second measurements minimum. The reference of Fukui teaches that it would have been known to use a parallel plate (see fig. 8, par. 3 and 12) functioning as claimed. It would have been obvious to one having ordinary skill in the art at the time of invention to combine the invention of Suguya with the use of an optical element (i.e. plane parallel plate first optical element or said second optical element) as the reference suggested and provide optical element that is adjusted such that a first measurement error tool induced shift (TIS) is measured upon limiting a shorter wavelength range in said illumination light, a second measurement error TIS is measured upon limiting a longer wavelength range, and said optical element is adjusted to make a difference in the first and the second measurements minimum as taught by Fukai for the purpose of aligning accurately.

As to claim 16, Sugaya and Fukai discloses everything claimed, as applied to claim 10 above, in addition Sugaya discloses variation in a difference between said image signal of ends of edges of said measurement mark calculated from the profile (fig. 8).

Claims 17, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over of Sugaya in view of Fukai, as applied to claims 1 and 3 above. The reference of Sugaya teaches of the features of claim 1 and 3, comprising inspection apparatus (fig. 19) and further suggested the disposing of additional optical element (i.e. plane parallel plate first optical element in illumination path or said second optical element in image path)(col. 28, line 25-29 and col. 28, line 33-36), however the reference of Sugaya is silent regarding wherein said optical element is disposed downstream of the illumination aperture stop and located in a parallel light flux portion between the illumination aperture stop and a condenser lens and wherein said optical element is disposed upstream of an aperture stop of the imaging optical system and located in a parallel light flux portion between the aperture stop of the imaging optical system and a relay lens. The reference of Fukui teaches that it would have been known to use a parallel plate (see fig. 8, paragraph 12) functioning as claimed. It would have been obvious to one having ordinary skill in the art at the time of invention to combine the invention of Suguya with the use of an optical element (i.e. plane parallel plate first optical element or said second optical element) as the reference suggested and provide optical element that is disposed downstream of the illumination aperture stop and located in a parallel light flux portion between the illumination

aperture stop and a condenser lens and to provide optical element that is disposed upstream of an aperture stop of the imaging optical system and located in a parallel light flux portion between the aperture stop of the imaging optical system and a relay lens as taught by Fukai for the purpose of alignment with accuracy.

Allowable Subject Matter

Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As to claim 13, the prior art of record, taken alone or in combination, fails to disclose or render obvious wherein said measurement mark comprises an indented portion having a depth equal to two to six times the focal length of said microscope apparatus.

Additional Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The references listed in the attached form PTO-892 teaches of other prior art mark position detection apparatus that may anticipate or obviate the claims of the applicant's invention.

Response to Arguments

In response to Applicant's arguments filed 08 May 2006 with respect to cited references as neither disclosing/suggesting compensating any differences in asymmetry that depended on wavelength of the illumination light page 8, par. 3 and 3, the examiner disagrees with the applicant arguments. Further in the May 16, 2006 interview we focused on the movement of the aperture plate stop (114/121) as not compensating for wavelength dependency as claimed. However, upon further consideration of the reference, Sugaya suggests compensating (i.e. by deposing plane parallel plate) any differences in asymmetry that depended on wavelength of the illumination light (col. 28, line 25-30). Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of claim amendment.

Fax/Telephone Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Isiaka Akanbi whose telephone number is (571) 272-8658. The examiner can normally be reached on 8:00 a.m. - 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Isiaka Akanbi
May 22, 2006